ZOOLOGICAL SCIENCE 2: 405–409 (1985)

Vampirolepis shirotanii sp. n. (Cestoidea: Hymenolepididae), with Records of Known Cestodes, from Bats of Japan[1]

Isamu Sawada[2]

Biological Laboratory, Nara University of Education, Nara 630, Japan

ABSTRACT—Hymenolepidid cestodes, five (including a new) species were recorded from cave bats collected at various places in Japan in 1984. *Vampirolepis shirotanii* sp. n. is described from the greater horseshoe bat, *Rhinolophus ferrumequinum nippon*, of Imajô-chô, Fukui Prefecture. *V. shirotanii* most closely resembles *V. iriomotensis*, but differs from it in longer neck and rostellum, larger rostellar sac, seminal receptacle, internal and external seminal vesicles and position of genital pores (located at a little posterior to the middle vs. located at a little anterior to the middle).

In succession to the investigation in 1983 [1], a large number of bats were examined for cestodes to obtain supplementary data on the helminth fauna of bats in Japan. This paper reports a new cestode with records of the known hymenolepidid cestodes, from bats in Japan.

MATERIALS AND METHODS

Bats were collected at various places in Japan (Fig. 1) from January to November, 1984. The bats were autopsied immediately after capture at the collection sites. Their alimentary canals were cut open as soon as possible and fixed in Carnoy's fluid. After being soaked in 45% acetic acid for 30 min for expanding, they were stored in 70% alcohol. In order to examine the inner structure of mature proglottides, interference contrast light microscope was used. Measurements are given in millimeters.

RESULTS

Bats examined and cestodes obtained are shown in Table 1.

Accepted January 31, 1985
Received January 7, 1985

[1] This paper corresponds to "Helminth Fauna of Bats in Japan XXXIII".

[2] Present address: Biological Laboratory, Nara Sangyo University, Sanzo, Nara 636, Japan

Vampirolepis Spassky, 1954

Vampirolepis shirotanii sp. n.
(Fig. 2)

Of two bats, *Rhinolophus ferrumequinum nippon*, collected at a manganese abandoned mine at Imajô-chô, Fukui Prefecture, on July 14, 1984, one was found infected with a specimen of this new cestode and 37 specimens of *Hymenolepis rashomonensis* Sawada, 1972, and the other bat with a specimens of *H.rashomonensis*.

Description: Medium-sized hymenolepidid; mature worm 43 long and 0.9 wide. Metamerism distinct, craspedote, margins serrate. All proglottides wider than long. Scolex 0.280 by 0.336, not sharply demarcated from strobila. Rostellum 0.140 long by 0.077 wide, armed with a single circle of 31 spanner-shaped hooks 0.018 long. Hook handle long; guard round at its end, slightly shorter than blade; blade sharp at its end. Rostellar sac elongated, 0.224 long by 0.126 wide, extending posteriorly to suckers. Suckers round, 0.112 in diameter. Neck slender, 0.445 long and 0.226 wide. Genital pores unilateral, located at a little posterior to middle of proglottid margins. Cirrus sac pyriform, 0.175–0.196 by 0.049–0.063, extending anterolaterally beyond osmoregulatory canals. Internal seminal vesicle, 0.105–0.126 by 0.049–0.056, enlarging to fill proximal portion of cirrus sac. External seminal vesicle elongate,

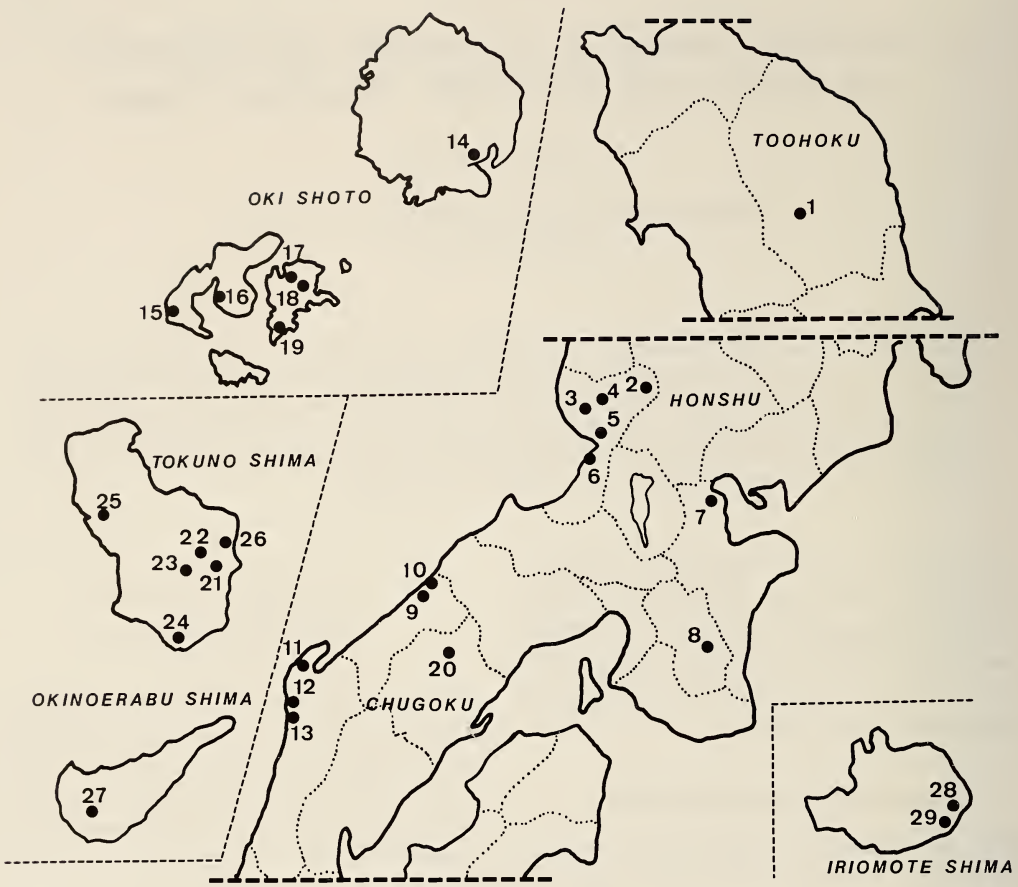

Fig. 1. Map showing the collection sites of bats. For locality number, see Table 1.

0.119–0.175 by 0.077–0.105. Testes three in number, ovoid, 0.119–0.147 by 0.070–0.084, arranged in form of triangle, one poral and two aporal. Vagina posterior to cirrus sac and external seminal vesicle. Seminal receptacle dorsal to ovary, measuring 0.196–0.231 by 0.077–0.098. Ovary bilobed, 0.280–0.294 wide, situated in anterior field of proglottid. Vitelline gland compact, 0.070 by 0.077, situated in posterior field of proglottid near midline in space between first and second testes. Uterus arising directly from ovarian lobes as a lobe sac, gradually enlarging, filling all available space in senile proglottides. Eggs spherical or ellipsoidal, 0.046–0.049 by 0.035–0.042, surrounded by four envelopes; outermost chorion slightly thick, with smooth surface. Onchospheres spherical, 0.028–0.032 by 0.028; embryonic hooks 0.014 long.

Type host: *Rhinolophus ferrumequinum nippon*.

Site of infection: Small intestine.

Type locality and date: Imajô-chô, Fukui Prefecture; July 14, 1984.

Type specimen: Holotype NUE Lab. Coll. No. 8501.

Remarks: The present new species closely resembles *V. iriomotensis* [2], from *R. imaizumii* in the number and length of rostellar hooks. However, it differs from *V. iriomotensis* in the longer neck (0.445 vs. 0.175); the longer rostellum (0.140 vs. 0.049); the larger rostellar sac (0.169–0.231 by 0.077–0.098 vs. 0.084 by 0.042); the larger internal seminal vesicle (0.105–0.126 by 0.049–0.056 vs. 0.070 by 0.035); the larger external seminal vesicle (0.119–0.175 by 0.077–0.105 vs. 0.035–0.042 by

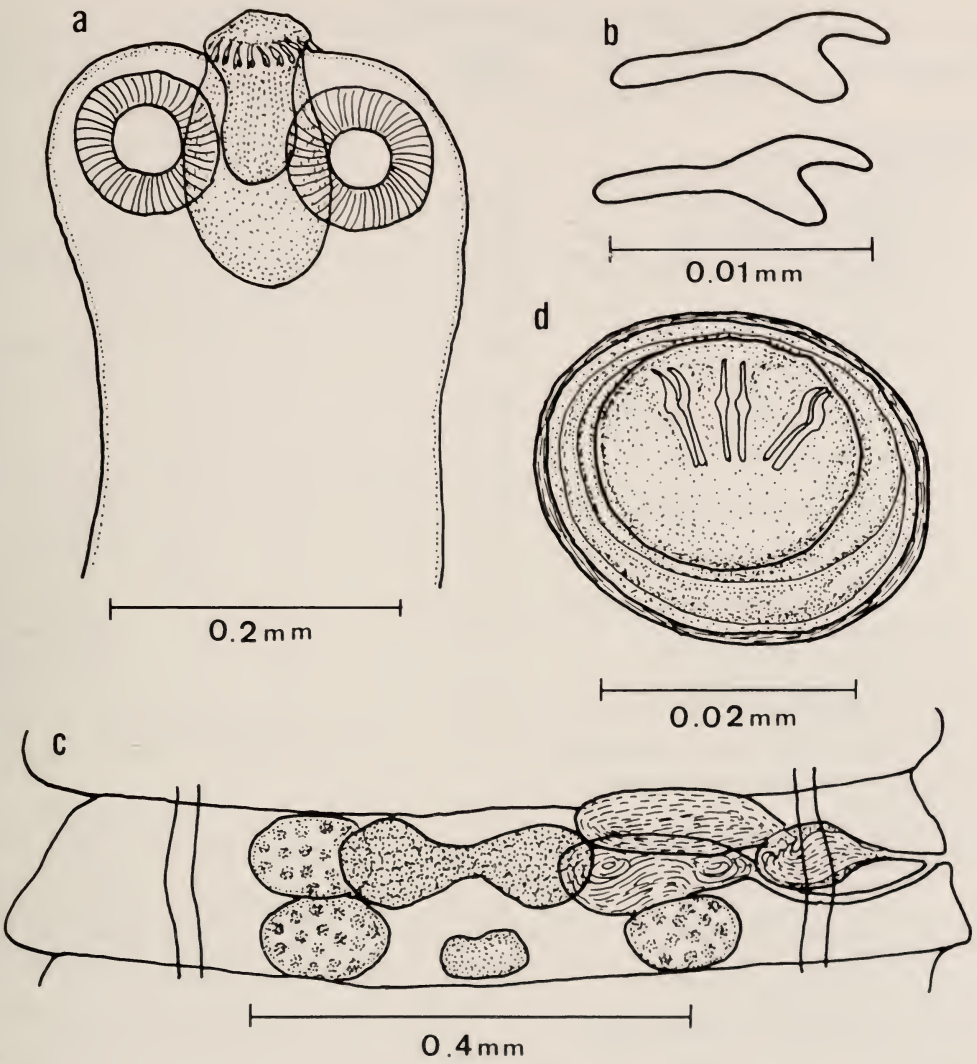

FIG. 2. *Vampirolepis shirotanii* sp. n. a: Scolex. b: Rostellar hooks. c: Mature proglottid. d: Egg.

0.035) and the position of genital pores (located at a little posterior to the middle vs. a little anterior to the middle).

Vampirolepis isensis Sawada, 1966 [3]

Host: *Rhinolophus cornutus cornutus*, *R. cornutus orii*.
For localities, see Table 1 and Figure 1.

Vampirolepis hidaensis Sawada, 1967 [4]

Host: *Miniopterus schreibersii fuliginosus*, *M.schreibersii blepotis*.
For localities, see Table 1 and Figure 1.

Vampirolepis ogaensis Sawada, 1974 [5]

Host: *R. ferrumequinum nippon*. For localities, see Table 1 and Figure 1.

Hymenolepis Weinland, 1858
Hymenolepis rashomonensis Sawada, 1972 [6]

Host: *R. ferrumequinum nippon*. For localities, see Table 1 and Figure 1.

Table 1. Localities and dates of cave bats examined and their cestode parasites in 1984

Host species Cave and locality	Date of collection	Number of bats examined	infected	%	Cestode found
Rhinolophidae					
(1) *Rhinolophus cornutus cornutus*					
4) Fumuro abandoned mine Takefu-shi, Fukui Pref.	Apr. 4 Nov. 22	1 10	0 0	0 0	
8) Akakura abandoned mine Kamikitayama-mura, Nara Pref.	May 27	6	1	17	*Vampirolepis isensis*
9) Ryûjin-dô A Iwami-chô, Tottori Pref.	Jul. 25	3	0	0	
11) Inome-ana Hirata-shi, Shimane Pref.	Nov. 17	6	1	17	*Vampirolepis isensis*
20) Kamba oni-no-ana Katsuyama-chô, Okayama Pref.	Apr. 8	2	0	0	
(2) *Rhinolophus cornutus orii*					
21) Akaushi-dô Tokunoshima-chô, Kagoshima Pref.	Jan. 18	15	1	7	*Vampirolepis isensis*
22) Tomiei-dô Tokunoshima-chô, Kagoshima Pref.	Jan. 18	8	1	13	*Vampirolepis isensis*
23) Mukôda-dô Tokunoshima-chô, Kagoshima Pref.	Jan. 18	1	0	0	
24) Ojima-dô Isen-chô, Kagoshima Pref.	Jan. 19	5	1	20	*Vampirolepis isensis*
25) Disused air-raid shelter Amagi-chô, Kagoshima Pref.	Jan. 19	3	0	0	
26) Abandoned mine Tokunoshima-chô, Kagoshima Pref.	Jan. 19	8	1	13	
(3) *Rhinolophus ferrumequinum nippon*					
2) Hakuba-dô Izumi-mura, Fukui Pref.	Nov. 23	5	3	60	*Hymenolepis rashomonensis*
3) Disused air-raid shelter Takefu-shi, Fukui Pref.	Nov. 22	3	2	67	*Hymenolepis rashomonensis*
5) Abandoned mine Imajô-chô, Fukui Pref.	Jul. 14	2	2	100	*H.rashomonensis* & *V. shirotanii* sp. n.
6) Artificial cave Tsuruga-shi, Fukui Pref.	Jul. 15	1	1	100	*H. rashomonensis*
15) Sea-eroded cave Nishinoshima-chô, Shimane Pref.	Nov. 11	4	2	50	*H. rashomonensis*
16) Artificial cave Nishinoshima-chô, Shimane Pref.	Nov. 11	1	1	100	*H. rashomonensis*
17) Disused air-raid shelter Ama-chô, Shimane Pref.	Nov. 11	2	2	100	*H. rashomonensis*
18) Disused house Ama-chô, Shimane Pref.	Nov. 11	1	0	0	
20) Kamba oni-no-ana	Apr. 8	6	3	50	*H. rashomonensis*
(4) *Rhinolophus imaizumii*					
29) Ôtomi-daini-dô Taketomi-chô, Okinawa Pref.	Jan. 24	18	0	0	
Vesperitilionidae					
(5) *Myotis macrodactylus*					
7) Abandoned mine Hokusei-chô, Mie Pref.	May 3	3	0	0	
9) Ryûjin-dô A	Jul. 25	15	0	0	
10) Ryûjin-dô B Iwami-chô, Tottori Pref.	Jul. 26	3	0	0	

Table 1. (Continued)

Host species Cave and locality	Date of collection	Number of bats examined	infected	%	Cestode found
(6) *Miniopterus schreibersii fuliginosus*					
10) Ryûjin-dô B	Jul. 26	5	1	20	*V. hidaensis*
12) Tagi-no-ana A Tagi-chô, Shimane Pref.	Nov. 17	12	1	8	*V. hidaensis*
13) Tagi-no-ana B	Nov. 17	1	1	100	*V. hidaensis*
14) Abandoned mine Saigô-chô, Shimane Pref.	Nov. 10	3	0	0	
19) Sea-eroded cave Ama-chô, Shimane Pref.	Nov. 11	2	0	0	
(7) *Miniopterus schreibersii blepotis*					
24) Disused air-raid shelter Amagi-chô, Kagoshima Pref.	Jan. 18	1	0	0	
25) Abandoned mine Tokunoshima-chô, Kagoshima Pref.	Jan. 19	3	0	0	
27) Shôryû-dô Chinan-chô, Kagoshima Pref.	Jan. 21	15	0	0	
29) Ôtomi-daini-dô	Jan. 24	17	1	6	*V. hidaensis*
(8) *Nyctalus lasiopterus aviator*					
1) Tree	Mar.18	1	0	0	
Hipposideridae					
(9) *Hipposideros turpis*					
28) Ôtomi-dô Taketomi-chô, Okinawa Pref.	Jan. 24	13	0	0	

ACKNOWLEDGMENTS

This study was supported by a Grant-in-Aid for Scientific Research from the Ministry of Education, Science and Culture, Japan. I am indebted to Mr. Masashi Harada, Laboratory of Experimental Animals, Osaka City University Medical School, for his generous cooperation. Thanks are also due to Messers. Junji Oohata, Yoshinori Shirotani, Hiroshi Saitô, Futoshi Nozu, Kanji Ishiwara, Ryûichi Inoue, Hideaki Kamiji and Miss Mitsuko Yamazaki for collecting bats.

REFERENCES

1 Sawada, I. (1984) Cestodes of bats from Japan, with descriptions of new species of the genus *Vampirolepis* (Cestoda: Hymenolepididae). Zool. Sci., **1**: 820–827.

2 Sawada, I. (1983) Helminth fauna of bats in Japan XXIX. Annot. Zool. Japon., **56**: 209–220.

3 Sawada, I. (1966) On a new tapeworm, *Vampirolepis isensis*, found in bats with the table of the morphological features of tapeworms in *Vampirolepis*. Japan. J. Med. Sci. Biol., **19**: 51–57.

4 Sawada, I. (1967) Helminth fauna of bats in Japan II. Japan. J. Parasitol., **16**: 103–106.

5 Sawada, I. (1974) Helminth fauna of bats in Japan XV. Annot. Zool. Japon., **47**: 103–106.

6 Sawada, I. (1972) Helminth fauna of bats in Japan XI. Bull. Nara Univ. Educ., **21**: 27–30.